very striking, the whole sky becoming of a lurid purple and very dark. The birds were hushed and frightened, and the charcoal burners' fires in the mountains, some five miles distant were plainly visible."

At Oran the weather appears to have been still more unpropitious than at the European stations. For the observations with the spectroscope, this section of the Expedition was provided with a 6-inch equatorial, of eight feet focal length, by Cooke, of York, lent by the Royal Observatory at Greenwich, to which was adapted an extremely ingenious recording spectroscope, the invention of Dr. Huggins, who himself observed with it; the management of the telescope devolving upon Captain Noble. A second smaller instrument, of 4 inches aperture, with a somewhat similar recording apparatus, was entrusted to Mr. W. Crookes, F.R.S., the Rev. F. Howlett attending to the telescope itself. The polariscopic observations were undertaken by Captain Salmond, R.E., and Lieutenant Collins, R.E.; the instrument of the former being attached to a telescope of about thirty inches focal length and 2½ inches aperture; that of the latter to another of 6 inches aperture. General observations, sketching of the corona, &c., were to have been made by Mr. Carpenter, of Greenwich Observatory, with an exquisite 3-in. Dolland equatorial; by Mr. Hunter, with a 4-in. of rougher construction; by Lieut. Wharton, R.N., of the *Urgent*, with a 2¾ achromatic, mounted temporarily equatorially; by Admiral Ommaney, with a small table telescope; by Lieut. Ommaney, R.E., with a binocular field-glass, on cards arranged for the purpose; and by the ship's officers generally, with such telescopes as they could command. The 6-in. and 4-in. equatorials were erected under a tent; the rest were employed more or less in the open air. Prof. Tyndall had established himself on a neighbouring fort, some 500 or 600 yards from the rest of the party, with a 5-in. telescope by Dallmeyer, which had been used by Mr. Dela Rue at the Total Eclipse in Spain. His observations were to be of a general character.

The atmospheric conditions in Oran in December are exceedingly like those of a very wet and windy English autumn, the day of entering into port having been the only moderately fine one experienced at all. The wind particularly was tremendous. On the 21st the observatory tent was blown down, and it was only by great exertions that the instruments themselves were saved from destruction.

The morning of the 22nd broke very doubtfully, heavy driving clouds obscuring the sun. The party were, however, all at their posts betimes, and arranged their various instruments long before the predicted instant of first contact. The clouds obscured the sun at this particular time; but soon, through a rift in them, the dark limb of the moon was seen encroaching on the sun's disc. Observation after this became very trying, as it was only possible at distant intervals to glimpse the progress of the moon, as she gradually advanced in her path. Spectroscopic observation, or even polariscopic observation, was practically impossible. Finally a glimpse was caught of the sun some eight or nine minutes before totality as a very thin crescent, and then every chink and cranny in the clouds closed up, and one dense and impenetrable pall covered the earth. Nothing remained now but to go out of the tent and observe the effect in the open air. It was certainly very striking. As the moment of totality approached, the western sky turned of an awful livid purple, the clouds over head assuming a black tint. As the shadow swept over the earth, the eastern sky became obscured, while the western horizon lighted up like the grey dawn of a dull autumn morning. At no time, however, during the totality, was it difficult to see the seconds on the face of a watch. The light was that of a cloudy evening, about an hour after sunset. One curious effect was observed, the apparent contraction or closing in of the celestial vault. Speedily, however, the dawn in the western horizon spread over the heavens; but the sun did not reappear again for at least half an hour after totality. M. Janssen, the French astronomer, who escaped, at the risk of his life, with his instruments in a balloon from Paris, was stationed on a mountain some seven miles from Oran. He can have seen nothing whatever of the phenomenon which he had braved so much to observe.

Another account from the same station states that the earlier stages of the Eclipse were seen and a photograph taken, but ten minutes before totality a dense bank of clouds came over the sun, which extinguished all hope, and rendered useless the laborious preparations of many weeks. M. Janssen was of course equally unsuccessful. Though the darkness was almost appalling as it rapidly increased up to the moment of totality, still the scene was deprived of a large part of its impressiveness by the dense mantle of cloud which concealed nearly the whole heavens.

SOCIETIES AND ACADEMIES

LONDON

Chemical Society, December 15.—Prof. Frankland, F.R.S., Vice-president, in the chair.—The following gentlemen were elected Fellows:—P. T. Atkinson, R. Koma, J. F. Stark. Mr. Perkin, F.R.S., read a paper "On some new Derivations of Coumarin." The author succeeded in obtaining the following new bodies:—

Dibromide of Coumarin	$C_9H_6O_2 . Br_2$
Dichloride of Coumarin	$C_9H_6O_2 . Cl_2$
α Bromocoumarin	$C_9H_5BrO_2$
β ,, ,, ...	,,
α Chlorocoumarin	$C_9H_5ClO_2$
β ,, ,, ...	,,
α Dibromocoumarin	$C_9H_4Br_2O_2$
β ,, ,, ...	,,
Tetrachlorocoumarin	$C_9H_2Cl_4O_2$
Coumarilic acid	$C_9H_6O_3$
Bromocoumaric acid	$C_9H_5BrO_3$
Sulphocoumaric acid	$C_9H_6O_2 . SO_3$
Disulphocoumaric acid	$C_9H_6O_2 . 2SO_3$

Dibromide of Coumarin.—A solution of coumarin in carbon disulphide is mixed with a similar solution of bromine, and the mixture, after leaving it to stand for twelve hours, allowed to evaporate spontaneously. When dibromide of coumarin is treated with an alcoholic solution of potassic iodide it becomes brown, and on evaporation deposits needles apparently consisting of a mixture of iodine and coumarin crystals, α *Bromocoumarin.* A simple process for the preparation of Bromocoumarin is to decompose the dibromide of coumarin with alkalis, the following reaction taking place:—

$$\underbrace{C_9H_6O_2Br_2}_{\text{Dibromide of coumarin.}} + KHO = \underbrace{C_9H_5BrO_2}_{\text{Bromocoumarin.}} + KBr + H_2O$$

α Bromocoumarin, when left in contact with cold alcoholic ammonia, decomposes with formation of ammonic bromide, and a non-crystalline sticky mass easy soluble in water. Heated with potassic hydrate it yields potassic bromide and a new acid. α *Dibromocoumarin.*—At a previous occasion Mr Perkin prepared this body by heating in a sealed tube to 140° C. a mixture of one part of coumarin, two parts of bromine, and four or five parts of disulphide of carbon. He since found, however, that this process is greatly improved by the addition of iodine to the mixture, as it is then only necessary to heat the sealed tube for four or five hours in a bath of salt and water to complete the reaction. The fusing point of this substance is 183° C. and not 174° C. as had been previously given. β *Bromocoumarin.*—The hydride of sodium bromosalicyl when submitted to the action of acetic anhydride, yields a quantity of hydride of bromosalicyl and a body which, when crystallised from alcohol, yields colourless flat prisms, the analysis of which showed it to be monobromocoumarin, $C_9H_5BrO_2$. It greatly differs in properties from the bromocoumarin previously described, its fusing point being 160°C., or 50° higher, and when boiled with alcoholic or aqueous potassic hydrate it does not decompose with formation of potassic bromide, but simply dissolves like ordinary coumarin. β *Dibromocoumarin.*—On treating the hydride of sodium *di*bromosalicyl with acetic anhydrate in exactly the same manner as for the preparation of β bromocoumarin, a beautifully crystalline product is obtained of the composition $C_9 H_4 Br_2 O_2$. It is not the same body as that obtained by acting on coumarin with bromine and iodine. It fuses at 176° C., and is not decomposed by boiling with a solution of potassie hydrate. Mr. Perkin has, therefore, designated it as β dibromocoumarin. *Dichloride of coumarin*—A solution of coumarin in chloroform absorbs chlorine gas, only minute quantities of hydrochloric acid being formed. On allowing the solution to evaporate spontaneously, after the chlorine has been passed through it for an hour or two, a syrupy product is obtained very like new honey. This is the dichloride of coumarin. From its products of decomposition, there can be no doubt that it possesses the formula—

$$C_9 H_6 O_2 Cl_2$$

Chlorocoumarin.—A mixture of one part of coumarin and three parts of pentachloride of phosphorus, when mixed and heated in a retort placed in an oil bath, slowly react upon each other as the temperature rises, and when the oil has reached about 200 C. the product becomes a dark brown liquid. During this reaction, a volatile liquid consisting chiefly of terchloride of phosphorus distils over. The contents of the retort after treatment with water, becomes a pasty mass of crystals, which is first purified by distillation, and then by several crystallisations from alcohol. Its analysis gave the formula $C_9 H_5 Cl O_2$. It fuses at 122°—123° C., and, when heated, possesses an agreeable aromatic odour. *Tetrachlorocoumarin.*—Chlorine gas when passed through a solution of coumarin and iodine in tetrachloride of carbon is rapidly absorbed, hydrochloric acid being evolved. If the gas be passed for two or three hours a quantity of a reddish body separates; on evaporating the product so as to separate the tetrachloride of carbon an oily residue is obtained, the red substance having fused with the impurities. On mixing this with alcohol, it soon becomes a white paste. On pressing this in a small linen bag, a white product is obtained which is further purified by being several times crystallised from spirit. The numbers of the analysis lead to the formula—

$$C_9 \, {}_2H \, Cl_4 \, O_2$$

It fuses at 144°—145° C. Bromocoumarin, when boiled with a solution of potassic hydrate, decomposes, yielding potassic bromide and the salt of a new acid, which has the formula $C_9 H_6 O_3$. Mr. Perkin proposes to call it *Coumarilic* acid. It fuses at 192°—193° C., distils with partial decomposition, but sublimes undecomposed when gently heated. It is monobasic, and forms well defined salts with the alkalis, the alkaline earths, lead, silver, mercury, and iron. *Bromocoumarilic acid.*—It is prepared like the above, but substituting α dibromocoumarin for bromocoumarin. It possesses the formula $C_9 H_5 Br O_3$, and fuses at 250° C. *Sulphocoumaric acid.*—It is obtained on digesting a mixture of about one part of coumarin and five parts of fuming sulphuric acid in the water bath for an hour or two. From the analysis of its salts, the formula of this acid when anhydrous is $C_9 H_6 O_2 SO_3$. Mr. Perkin has prepared ammonic, potassic, sodic, baric, and strontic sulphocoumarinates. *Disulphocoumaric acid.*—On heating a mixture of about 8 parts of fuming sulphuric acid and 1 part of coumarin to a temperature of 150° or 160° C. for an hour or two, the produced will contain two sulphoacids, viz., sulphocoumaric acid and disulphocoumaric acid. Its barium salt has the formula—

$$C_9 H_4 O_2 Ba'' \, 2 \, SO_3.$$

—The next communication was by Dr. Debus. "On the formula of glyoxylic acid," Dr. Debus showed that this acid ought to be written $C_2 H_2 O_3$ and not $C_2 H_4 O_4$. He considers it in reality to be the aldehyde of oxalic acid. Among other reasons for this view he quoted its behaviour towards the bisulphites. Dr. Odling was of the same opinion. He saw the aldehydic character of glycxylic acid in its property of combining with one atom of water or of ammonia, or ethylic chloride, &c. Mr. Perkin defended the formula $C_2 H_4 O_4$, quoting among other evidences for the correctness of his views, the behaviour of glyoxylic acid when treated with phosphoric pentabromide; instead of losing water and being converted into CO, it takes up three atoms of bromine.

TAUNTON

Somersetshire Archæological and Natural History Society, December 12.—W. E. Surtees, president, in the chair. In a paper by Mr. Cecil Smith on some rare birds found in the immediate neighbourhood of Taunton, a few observations were made on the following birds, specimens of all of which were produced. The first mentioned was the Pied Flycatcher, which had been killed in an orchard near French Weir, close by the town. Though rare in this and other southern and western counties, it was much more common in more northern counties, especially in the Lake district, where it was a summer visitant, remaining from April to November—it had, however, been taken as late as the middle of October at the Scilly Islands, when on its southern migration. The next bird mentioned was White's Thrush, of which four, or at most five, British specimens had been recorded. The specimen produced, which brought this bird within the limits to which Mr. Smith's paper was confined, had been killed at Hestercombe Wood, in January 1870; it was shot at by mistake for a woodcock. Of this bird it was observed that although it might be difficult to account for its presence in England, or even in Europe, there could be no doubt as to its identity, as this and other British killed specimens did not differ in the slightest degree from those brought over from Japan and the East. On the difficulty of accounting for its presence in England, Mr. Smith observed that the journey performed being almost entirely over land, the reason given for the appearance of many, especially of American birds on our shores, that being driven out of their usual migratory course, and out to sea by strong gales, they found no place of rest before reaching our shores, was not applicable. Neither would the supposition that it had got mixed up with flocks of other perhaps nearly allied species on what had been a common breeding ground, and accompanied them, be applicable. Still less would the theory hinted at in Yarrell that the occasional appearance of these Eastern birds in Europe is not so very strange, since as many as 114 species are enumerated by Temminck as common to Europe and Japan; but of these 114 species the great majority are inhabitants of both countries, and not wanderers from one to the other. One instance, the almost universally distributed Turnstone, was taken as an example, which, instead of wandering to such an enormous extent, appeared to be equally content, whether on the muddy shores of Somerset or at the Cape of Good Hope or in Japan. Perhaps, after all, the appearances of White's Thrush were to be attributed to a truant and vagrant disposition in the bird itself, which might lead it far from his own home. Probably the habits of the bird contributed slightly to its rarity in Europe, as it appeared to keep much out of sight in woods and plantations, and it had consequently, as in the present instance, been shot by mistake for a woodcock. The next bird mentioned was Tithy's Redstart, which was considered worthy of notice as having occurred so close to the town as Gulmington-lane. The difference between this bird and our summer visitant, the common redstart, was pointed out, and specimens of each shown. The peculiarity of this bird being a winter rather than a summer visitor to these islands, was remarked on especially, as it is a regular summer visitor to the middle and northern parts of Europe. Also its choice of localities, namely, rough, rocky situations, such as the Parson and Clerk rock at Teignmouth (at which place Mr. Smith had several times seen it in the month of November), in which it differed much from the common redstart, which preferred gardens, orchards, and hedgerows. The difference of the eggs was also remarked upon, those of the present species being white instead of the well-known blue of the common redstart. The occurrence of one specimen of the Sevin Finch, within the town of Taunton itself, brought this bird within the range of the paper, Mr. Smith observing that in the Birds of Somerset he had thrown some doubt upon this specimen, supposing it might be an escape, the time of year at which it was killed, the end of January or beginning of February, more than the rareness of the bird itself, leading to this doubt; he felt, however, bound to admit that there did not appear about the bird itself any signs of its having been in confinement. The other British specimens appear to have occurred in the summer between April and October, as might be supposed from its being an inhabitant of the south of Europe, and growing scarcer as we get farther north. The similarity to the Siskin was also mentioned, and specimens of this bird produced for the purpose of comparison, the difference in the shape of the beak being pointed out as the most reliable distinction, especially by candle light, which considerably increased the difficulty of distinguishing the colours. The Little Bittern and Baillon's Crake were also mentioned, and a specimen of each produced, both having been killed nearly in the same place, some rushy pools by the side of the river in Priory Fields. Attention was called to the similarity between the Little Bittern and its big relation, in the absence of feathers at the back of the neck. Mr. Smith added that he had seen by chance, in the shop of Mr. Petherick, the bird stuffer, a specimen of the Woodsandpiper, which had been killed by Mr. Petherick himself, on the 9th of May last, as near as Cheddar, which would bring it quite within range for mention in the paper

MANCHESTER

Literary and Philosophical Society, November 29.—R. Angus Smith, Ph.D., F.R.S., vice-president, in the chair. Mr. R. D. Darbishire, F.G.S., exhibited a series of palæolithic instruments from the valley of the Little Ouse, and explained (after Mr. J. W. Flower, Q. J. Geolog. Soc. xxv. 449) the general features of the district and the deposit of the beds and the implements.—Mr. W. Boyd Dawkins, F.R.S., indicated the age of these deposits as related to the period of the existence of *Elephas primigenius* in the district of the south-east of England and the adjoining portions of the bed of the German Ocean and the north-west portions of France.—"The Tails of Comets, the Solar Corona, and the Aurora considered as Electric Phenomena," by Prof. Osborne Reynolds, M.A. Although the tails of comets are usually assumed to be material appendages which accompany these bodies in their flight through the heavens—and the appearance they present certainly warrants such an assumption—yet this is not the only way in which these tails may be accounted for. They may be simply an effect produced by the comet on the material through which it is passing, an effect analogous to that which we sometimes see produced by a very small insect on the surface of still water. We see a dark spot, and on looking closer we find a small fly or moth flapping its wings and creating a disturbance which was visible before the insect which produces it. There is nothing else that we can conceive their tails to be, so that they must be one or other of these two things: either (1) material appendages of the nucleus, whether the material be limited to the illuminated tail or surround the comet on all sides; (2) matter which exists independently of the comet, and on which the comet exerts such a physical influence as to render it visible. There can be no doubt that if these tails are matter moving with the comet, this matter must be endowed with properties such as we not only have no experience of, but of which we can form no conception. This alone would seem a sufficient reason for rejecting the first hypothesis. Moreover, on the second hypothesis there is no difficulty in the immense velocity with which these tails are projected from the head or whirled round when the comet is in perihelio. For to take the "negative shadow" as an illustration, here we should have a velocity of projection equal to that of light, and the only effect of the whirling would be a slight lagging in the extremity of the tail, causing curvature similar to that which actually exists. And whatever the action may be, if its velocity of emission or transmission be sufficiently great, this effect will be the same; but whether this hypothesis is to be rejected because involving assumptions beyond conception or contrary to experience, must depend on the answers to the following question: Do we know, or can we conceive, any physical state into which any substance which can be conceived to occupy the space traversed by comets could possibly be brought so as to make it present the appearance exhibited by comets? Now I think the answer must be in the affirmative, and that we may leave out the terms conceive and conceivable. For electricity is a well-known state, and gases are well-known substances; and when electricity, under certain conditions, as in Dr. Geissler's tubes, is made to traverse exceedingly rare gas, the appearance produced is similar to that of the comets' tails; the rarer this gas is, the more susceptible is it of such a state, and so far as we know there is no limit to the extent of gas that may be so illuminated. Hence we may suppose the exciting cause to be electricity, and the material on which it acts and which fills space to have the same properties as those possessed by gas. What is more, we can conceive the sun to be in such a condition as to produce that influence on this electricity which should cause the tail to occupy the direction it does. For such an electric discharge will be powerfully repelled by any body charged with similar electricity in its neighbourhood. The electricity would be discharged by the comets on account of some influence which the sun may have on them, such an influence being well within the limits of our conception. The appearances of the comet in detail, such as the emission of jets of light towards the sun and the form of the illuminated envelope, are all such as would necessarily accompany such an electrical discharge. In fact, if the possibility of such a discharge is admitted, I believe it will explain all the phenomena of comets. As to the possibility, or even the probability of such a discharge, I think it may be established on very good grounds. The tails of comets may or may not be one with their heads; but whichever is the case, it is certain that the difference in the appearance of comets and of planets indicates some essential difference either in the materials of which these bodies are respectively composed, or else in the conditions under which their materials exist. Now from the motion of comets we know that their heads follow the same laws of motion and gravitation as all other matter, and therefore we have good evidence, so far as it goes, that comets and planets are similarly constituted as regards materials. And since the appearance of a comet changes very much as it passes round the sun, any assumptions with regard to the material of comets, in order to account for their difference from planets, could not account for the variety of appearance the same comet presents at different times. On the other hand, the conditions of comets and planets must necessarily be very different, from the extreme difference in the shapes of the orbits they describe. Each planet remains nearly at a constant distance from the sun (whatever that distance may be), so that the heat or any physical effect the sun may have upon it will also be constant; on the comets its action must change rapidly from time to time, particularly when the comet is in certain parts of its orbit. Hence we may say that the temperature and general physical condition of planets is nearly constant, and that of comets for the most part continually varying. From these reasons it seems to me not only possible, but probable, that these strange visitors to our system are clothed in electrical garments with which the regular inhabitants are unacquainted. The electricity must after all depend on the composition of the comet, for known substances do not all show the same electrical properties. Hence by assuming comets to be composed of various materials, we have a source to attribute the different appearances presented by the different individuals. To the same source we may attribute the irregularity in the direction of their tails and the lateral streamers they occasionally send out. Secondly, I think this electrical hypothesis is supported by the to me seeming analogy between comets, the corona, and the aurora; an analogy which suggests that they must all be due to the same cause. They may be all described as streams of light or streamers, having their starting point more or less undefined, and traversing spaces of such extent and with such velocities as entirely to preclude the possibility of their being material in any sense of that word with which we are acquainted. The aurora has long been considered as an electric phenomenon, and recently the same effect has been produced by the discharge of electricity of very great intensity through a very rare gas, there being no limit to the space which it will thus traverse. This being so, why should not the tails of comets and the corona also be electric phenomena? Their appearance and behaviour correspond exactly with those of the aurora, and there is surely nothing very difficult in imagining the sun which is the source of so much heat being also the source of some electricity. Neither will there appear anything wonderful in the electricity of comets when we consider that of the earth. We must not look on our inability to explain the cause of such an electric discharge as fatal to its existence, for we cannot any more explain the existence of the electricity which causes the aurora. If we cannot explain from whence these electricities come, we can at least show that the conditions which are most favourable to the development of the aurora exist in much greater force on the comets than they do on the earth. The greatest development of the aurora borealis takes place at the equinoxes. There is a cessation in summer, and another in winter. Now, the equinoxes are the times when the action of the sun on our northern hemisphere is changing most rapidly. Hence the condition favourable for the aurora is change in the action of the sun. The same thing is pointed out by the diurnal variation in the electricity of the atmosphere. Now, as has been already shown, the change in temperature on the comets is incomparably greater than it is on the earth, and its variation corresponds with the variation in the splendour of the comet. Angström has also shown that the light from the aurora, the corona, and the zodiacal light, are all of the same character, or all give the same bright lines when viewed through the spectroscope, and that these lines correspond to the light from no known substance. This indicates that whatever this light may be, the incandescent material is the same in all cases; or may we not assume that it is the medium which fills space that is illuminated by the electric discharges? This would be supported by the fact that the light from the heads of two small comets indicated carbon, whereas that from the tails only gave a faint continuous spectrum. For an electric discharge would first illuminate the atmosphere of the comet, or even carry some of the solid material off in a state of vapour, and then pass off to the surrounding medium. Thus while the spectrum from the head would be that of cometary matter, the tail would be due to the incandescent ether. I would here suggest that gas, when rendered incandescent by electricity, may reflect light—it will certainly cast a shadow from the electric light—and if this be the case, part of the light from comets' tails may after all be reflected sunlight. At any rate, it is certain that the appearance of streamers, the rapidity of change and emission, the perfect transparency and the wave-like fluctuations which belong to these phenomena, are all exhibited by the electric brush; in fact, the electric brush will explain all these appearances which have defied all attempts at explanation on a material hypothesis. I have only to add that the main assumption involved in the electric theory is that space is occupied by matter having similar electrical properties to those of gas; and I would ask, is it not more rational to make such an assumption than it is to attribute unknown and inconceivable properties to cometary matter? Theories, even if founded only on rational speculation, often, I believe, prove very useful, inasmuch as they afford observers a definite purpose in their observations—something to look for, something to establish or to refute; and I publish these speculations of mine at this particular moment in the hope that they may perchance serve such a purpose.

PHILADELPHIA

American Philosophical Society, October 7.—Dr. Binton made some observations on a Mazahc theological work and grammar, indicating probable resemblances between the language of that nation and that of the Aztecs. He also described a grammar of the Moska nation of New Granada, prepared by Father Lugo.—J. A. Macneil described the ruins and other remains of the ancient nations, which he had discovered during several expeditions in Nicaragua, Costa Rica, Chiriqui, and Chiapas. He made especial reference to an extensive series of ruins he had discovered near the boundaries of Chiriqui and Costa Rica. One of the buildings was 600 feet in length, and 25 to 30 feet elevation. Among other sculptures he observed a well-executed stone alligator of large size.—Prof. Cope exhibited the remains of a new cretaceous tortoise, of the genus *Adocus* Cope, to be called *A. syntheticus*. He explained that he had been able to establish more fully the characters of the genus *Adocus;* that it was found to possess an intergular shield as in the Pleurodira, but had not the sutural union of the inferior pelvic elements with the plastron of that type. He said that these characters had been heretofore known as correlatives from the cretaceous period to the present day, and that this genus presented us with the first exception to the rule. The genus was therefore regarded as a generalised type, and to be elevated to the rank of a family. Prof. Cope exhibited a metatarsus of *Taelaps aquilunguis*, the first known, and said it proved the distinctness of those elements from each other in that type, and their slenderness, taken collectively. The specimen was an external one, without trace of a rudimental one outside of it; that its measurement, 16 inches, was indicative of a length of 18 inches to the median metatarsus, a length he had already assigned to it on theoretical grounds. Prof. Cope read a paper entitled, "Contribution to the Ichthyology of the lesser Antilles." Two new genera were described in it, viz., *Eleutheractis* and *Cryptotomus*.

Academy of Natural Sciences, November 8.—Prof. Leidy characterised three species of extinct turtles, obtained by Prof. Hayden's party from the tertiary deposits of Wyoming. Two were named *Emys Haydeni* and *E. Jeanesi*. The third, partaking of characters of the genera *Chelydra* and *Dermatemys*, was named *Baena arenosa*. A lacertian, as large as the largest of our living Iguanas, was characterised from the greater part of the bones of a skeleton imbedded in a rock of tertiary age, from Wyoming. The vertebræ have the characteristic ball and socket-joint to the bodies, but they are devoid of the zygosphene and zygantrum. The teeth are compressed conical, slightly curved, sharp-pointed, and trenchant. The remains were referred to a species with the name of *Saniwa ensidens*. The names *Baena* and *Saniwa*, according to Prof. Hayden, are those given to the turtle and lizard by one of the aboriginal tribes of the Upper Missouri.

VIENNA

I. R. Geological Institute, December 6.—Dr. Laube presented a memoir on "the Echinidæ of the Upper Tertiary Deposits in the Austro-Hungarian Empire," which will be printed in the fifth volume of the Memoirs of the Institute. The total number of distinct species is 37, six of which belong to the lower, and 31 to the upper part of the Mediterranean formation.—M. F. Foetterle "on the Sarmatic formation in the Bukowina and Northern Moldavia." It occupies an enormous space in both countries, and is easily divided in two members, an upper formed of yellow sand and sandstone, and a lower which consists of blue clay. Both contain fossils in abundance. The clay is everywhere permeated with very thin veins and layers of fine sand, which give free access to water, and thus cause the greatest difficulties for the railroad between Czernowitz and Jassy, which for long tracts passes over the clay, and is damaged by very long continued falls of rain.—M. Th. Fuchs reported on the Fauna of the Congeria-beds of Tihany and Kup in Hungary.—M. Ch. v. Hauer communicated the analysis of fire-proof clay of Fohnsdorf (Styria) which forms there a layer 9 feet thick in the browncoal basin. It consists of a hydrosilicate of alumina and magnesia, and belongs to the so-called soap-stones.—M. E. Tietze gave notice of the discovery of fossiliferous beds belonging to the brown Jura at Boletin, in Servia, and of neocomian and turonian beds in north-eastern Servia.—M. M. Neumayr presented a memoir on the jurassic flint-limestones of the Carpathians.—M. D. Stur exhibited a magnificent collection of eocene fossils from the environs of Vicenza, which had been purchased for the Museum of the Institute.

DIARY

FRIDAY, January 6.

Geologists' Association, at 8.

SATURDAY, January 7.

Royal Institution, at 3.—Burning and Unburning: Prof. Odling (juvenile lectures).

SUNDAY, January 8.

Sunday Lecture Society, at 3.30.—Malta and the Maltese, with a visit to St. Paul's Bay: Dr. Carpenter.

MONDAY, January 9.

Royal Geographical Society, at 8.30.

TUESDAY, January 10.

Photographic Society, at 8.

Ethnological Society, at 8.—On the Prehistoric Remains in Brittany: Lieut. S. P. Oliver, R A—Exhibition of Stone Implements from Queen Charlotte's Island: Dr. Hooker, C.B.—On a Cairn near Cefn, St. Asaph: Rev. D. R. Thomas, M.A., and Mr. T. McK. Hughes, M.A.

WEDNESDAY, January 11.

Geological Society, at 8.—On the older Metamorphic Rocks and Granite of Banffshire: Mr. T. F. Jamieson, F G.S.—On the Connection of Volcanic action with Changes of Level: Mr. J. J. Murphy, F.G.S.—On the Geology of the neighbourhood of Malaga: Don M. de Orueba.

Royal Microscopical Society, at 8.—On the Anatomy of *Ascaris lumbricoides*: Mr. B. T. Lowne, M.R.C S.—On the use of Colloid Silica in preparing Crystals for the Polariscope: Mr. H. J. Slack.

THURSDAY, January 12.

Royal, at 8.30.

Society of Antiquaries, at 8.30.

London Mathematical Society, at 8.—On Systems of Tangents to Plane Cubic and Quartic Curves: Mr. J. J. Walker.—On the Order and Singularities of the Parallel of an Algebraical Curve: Mr. S. Roberts.

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